

CLAIM AMENDMENTS

1. (currently amended): A method [~~Method~~] for finding the Reflection Coefficient (RC) of reflectors in illuminated areas of the subsurface of the ground, [~~said method~~] comprising:
- a) migrating to depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), using shot/receiver pairs, to obtain [~~thereby achieving~~] a real depth migrated seismic cube $P_{Obs}(\bar{x})$ which is a function of the recorded traces that have each been given a weight $w_i(\bar{x})$;
- b) interpreting $P_{Obs}(\bar{x})$ to find the spatial positions of the reflectors in the subsurface, and based on these reflectors and the seismic velocities, a depth model is established in the computer, wherein one of the reflector surfaces [~~and one of the reflectors~~] in the depth model is chosen to be the target reflector;
- c) computing synthetic traces from the target reflector for all shot/receiver pairs by [~~in the survey that was used in a);~~]
- [~~d~~] setting the RC of the target reflector in the depth model to an essentially constant value when the synthetic traces are computed;
- [~~e~~] d [~~doing~~] performing a local PSDM of the computed synthetic traces in a band around the target reflector to obtain a modeled synthetic PSDM cube $P_{Mod}(\bar{x})$ locally around the target reflector; and
- [~~f~~] e measuring the amplitudes along the target reflector [~~on~~] from the real

PSDM cube $P_{Obs}(\vec{x})$, and dividing these amplitude measurements by the corresponding amplitude measurements from the modeled PSDM cube $P_{Mod}(\vec{x})$, ~~[thereby obtaining an estimate]~~ to thereby obtain discrete estimates of the angle dependent RC for all illuminated areas of the target reflector ~~[with corresponding reflection angle]~~ and a weight function for all discrete estimates of the RC along the target reflector.

Claims 2 to 6 (*cancelled*)

7.(*currently amended*): An article of manufacture comprising:

- a computer usable medium having computer readable program code embodied therein for finding the Reflection Coefficient (RC) of reflectors in illuminated areas of the subsurface, the computer readable program code in said article of manufacture comprising:

- a) computer program means for enabling a computer to determine depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), using shot/receiver pairs, ~~[thereby achieving]~~ to obtain a real depth migrated seismic cube $\{P_{Obs}(\vec{x})\}$ which is a function of the recorded traces that have each ~~[has]~~ been given a weight $w_i(\vec{x})$;
- b) said computer program means including means for enabling a computer to interpret $P_{Obs}(\vec{x})$ to find the spatial positions of the reflectors in the subsurface, and based on these reflectors and the seismic velocities a depth model is established in the computer, ~~[and one of the reflectors]~~ wherein one of the reflector surfaces in the depth model is chosen to be the target reflector;
- c) said computer program means including means for enabling a computer to

compute synthetic traces from the target reflector from all shot/receiver pairs
[in the survey that was used in a);

~~d) said computer program means including means for enabling a]~~ **by**

programming the computer to set the RC of the target reflector in the depth
model to an essentially constant value when the synthetic traces are computed;

d) [e)] said computer program means including means for enabling a computer
to perform a local PSDM of the **computed** synthetic traces in a band around
the target reflector to obtain a modeled **synthetic** PSDM cube $P_{Mod}(\vec{x})$ **locally**
around the target reflector; and

e) [f)] said computer program means including means for enabling a computer to
measure the amplitudes along **the** target reflector [on] **from** the real PSDM cube
 $P_{Obs}(\vec{x})$, **and** dividing these **amplitude** measurements [with] **by** the corresponding
amplitude measurements from the modeled PSDM cube $P_{Mod}(\vec{x})$, [obtaining an
estimate] **to thereby obtain discrete estimates** of the angle dependent RC [with
corresponding reflection angle] **for all illuminated areas of the target reflector**
and **a weight function for all discrete estimates of the RC along the target**
reflector.

Claims 8 to 12 (*cancelled*)

13. (*currently amended*):The method according to claim 1, wherein the RC in
[d)] **c)** is set to 1.0 in the calculation of the synthetic traces.

14. (*currently amended*):The method according to claim 1, wherein the same
weights $w_i(\vec{x})$ in the PSDM in a) are used in the local PSDM in [e)] **d)**.

15. (*currently amended*):The method according to claim 1, wherein “square” method or “norm” method is used for measuring the amplitudes in [f)] e).
16. (*currently amended*):The method according to claim 1, wherein [the process in a)-f) is] steps a) to e) are repeated for points along the target reflector to create a map of the RC [for the target reflector] with corresponding angles.
17. (*previously submitted*):The method according to claim 1, wherein the synthetic traces in c) are computed by ray tracing.
18. (*currently amended*):The computer program according to claim 7, wherein the RC in [d)] c) is set to 1.0 in the calculation of the synthetic traces.
19. (*currently amended*):The computer program, according to claim 7, wherein the weights $w_i(\bar{x})$ in the PSDM in a) are used in the local PSDM in [e)] d) .
20. (*currently amended*):The computer program according to claim 7, wherein the “square” method or “norm” method is used for measuring the amplitudes in [f)] e).
21. (*currently amended*):The computer program according to claim 7, wherein the [process in a)-f)] program means in a) to e) is repeated for points along the

target reflector to make a map of the RC for the target reflector.

22. *(previously submitted)*: The computer program according to claim 7, wherein the synthetic traces in c) are computed by ray tracing.

23. *(currently amended)*: A data set representing the Reflection Coefficient (RC) of illuminated areas of subsurface reflectors produced by

a) migrating to depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), using shot/receiver pairs, ~~[thereby achieving]~~ **to obtain** a real depth

migrated seismic cube $P_{Obs}(\bar{x})$ which is a function of the recorded traces that have each been given a weight $w_i(\bar{x})$;

b) interpreting $P_{Obs}(\bar{x})$ to find the spatial positions of the reflectors in the subsurface, and based on these reflectors and the seismic velocities, a depth model is established in the computer, wherein one of the reflector surfaces ~~[and one of the reflectors]~~ in the depth model is chosen to be the target reflector;

c) computing synthetic traces from the target reflector for all shot/receiver pairs **by** ~~[in the survey that was used in a)]~~

~~[d)]~~ setting the RC of the target reflector in the depth model to an essentially constant value when the synthetic traces are computed;

d) [e)-doing] performing a local PSDM of the computed synthetic traces in a band around the target reflector to obtain a modeled synthetic PSDM cube $P_{Mod}(\bar{x})$ locally around the target reflector; and

e) ~~[f]~~ measuring the amplitudes along the target reflector ~~[e]~~ **from** the real PSDM cube $P_{Obs}(\bar{x})$, and dividing these **amplitude** measurements by the corresponding **amplitude** measurements from the modeled PSDM cube $P_{Mod}(\bar{x})$, to ~~[thereby obtain an estimate]~~ **obtain discrete estimates** of the angle dependent RC **for all illuminated areas of the target reflector** ~~[with corresponding reflection angle]~~ and ~~a~~ weight function **for all discrete estimates of the RC along the target reflector.**

24. *(currently amended)*: The data set according to claim 23, wherein **the** RC in ~~[d]~~ **c)** is set to 1.0 in the calculation of the synthetic traces.

25. *(currently amended)*: The data set according to claim 23, wherein the same weights $w_i(\bar{x})$ in the PSDM in a) are used in the local PSDM in ~~[e)]~~ **d)**.

26. *(currently amended)*: The data set according to claim 23, wherein “square” method or “norm” method is used for measuring the amplitudes in ~~[f)]~~ **e)**.

27. *(currently amended)*: The data set according to claim 23, wherein ~~[the process in a)-f) is]~~ **steps a) to e) are** repeated for points along the target reflector to create a map of the RC ~~[for the target reflector]~~ **with corresponding angles.**

28. *(previously submitted)*:The data set according to claim 23, wherein the synthetic traces in c) are computed by ray tracing.
29. *(previously submitted)*:A map produced by multidimensional plotting of the data set according to claim 23.